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Clinical Section

Present Day Views on the Surgical Treatment of Duodenal Ulcer*

by

P. H. T. THORLAKSON, M.D., F.R.C.S. (Can.)

Winnipeg, Manitoba

During the past two decades an interesting series of changes have occurred in views held by medical and surgical authorities as to indications for, and methods of surgical treatment in duodenal ulcer. In the early twenties, there was little agreement between internist and surgeon about the treatment of ulcer.

The senior medical men on the Winnipeg General Hospital staff insisted that the treatment of duodenal ulcer was medical, but nevertheless they frequently referred uncomplicated chronic ulcers for surgical treatment. It would seem that their advocacy of medical treatment was not based on any absolute conviction or any positive certainty as to the adequacy of their methods.

A leading surgeon of that period said that a duodenal ulcer patient should be operated on after he had been cured medically nine times. This statement indicated a recognition of the fact that early surgical interference was inadvisable yet it did contain an element of ridicule. In other words one had to convince both the internist and patient that nothing permanent could be expected from medical treatment. The surgical opinion of the day seemed to be that any ulcer which could be labelled chronic, required operative treatment, viz., posterior gastro-enterostomy, with or without cauterization of the lesion. In that period a gastro-enterostomy was performed for an uncomplicated duodenal ulcer or a chronic duodenal ulcer associated with obstruction, hemorrhage or persistent pain irrespective of the patient's age, nervous stability or other factors which we now know to be of paramount importance in the selection of the patient for surgery, and in the choice of procedure applicable to that patient.

This, I believe, is a fair statement of the position during my period of apprenticeship in surgery. The medical treatment was the Sippy regime, or some slight modification. The surgical treatment was a posterior gastro-enterostomy. The treatment of chronic duodenal ulcer was simply a choice between two standard alternative methods.

By 1930 there was a marked revival of interest in pyloro-plastic procedures. The Finney operation and Judd's operation were commonly done. Wilkie of Edinburgh was advocating a Kocher

lateral gastro-duodenostomy. The adoption of these procedures indicated that these and many other surgeons were not entirely satisfied with the results of gastro-enterostomy in spite of the recorded incidence of stoma ulcers in only two to six percent of cases. Unfortunately, the simpler and safer procedures (local excision and plastic repair of the pylorus) were attended by a much higher percentage of failures and have now been practically discarded. There are cases, however, in which a wide Kocher gastro-duodenostomy is a useful procedure. I have performed this operation in several instances with complete relief of symptoms. For a marked degree of pyloric obstruction in patients with gastroparesis it is a procedure which is more likely to be satisfactory than a gastro-enterostomy.

In 1933 Lewisohn threw a bombshell into the world of surgery when he reported an incidence of stoma ulcer as high as 34% after gastro-enterostomy. It is interesting to note that these unsatisfactory results of posterior gastro-enterostomy were emphasized during a period of severe economic stress. While it is admitted that the average incidence of stoma ulcer following routine posterior gastro-enterostomy is probably somewhere about midway between the extremes of 2 and 34%, depending on the duration and thoroughness of the follow-up, its occurrence is a serious drawback to surgical treatment.

Years ago it was said by some authorities that if no stoma ulcer had occurred after a lapse of two years following a gastro-enterostomy, the patient was quite unlikely to develop any such complication. This statement can be readily disproven; in the past few months we have seen five patients who had been free of symptoms from sixteen to twenty-nine years following gastro-enterostomy. The last one, now under our care, had a gastro-enterostomy for duodenal ulcer in 1921. He came to us because of the recent development of symptoms which have been proven due to a gastro-colic fistula.

Etiological Factors

During the past two decades a great deal of experimental and clinical investigation into the etiology of peptic ulcer has been done. As a result of these studies it is now possible to take a broader view of both etiology and treatment. In as much as rational treatment depends on one's concept of the cause of the lesion it may be well briefly to review the modern ideas as to the etiology of peptic ulcer.

Without detailing the numerous studies that have an important bearing on this subject, let us summarize the conclusions to which they have led. During the last century there has been a controversy regarding the relative importance of central

* Presented at the Post-Graduate Course, University of Alberta, Edmonton, Alberta, May, 1940.

* Presented at the Annual Meeting of the Manitoba Medical Association, Winnipeg, Manitoba, September, 1940.

and local factors in the etiology of ulcer. The central and nervous factors are many and varied, depending on heredity, nervous temperament, habits, especially in the use of tobacco and alcohol, exposure to continued nervous strain, etc. Some of the steps demonstrating the importance of these central factors in ulcer may be mentioned:

- (1) Cushing and others have recorded a number of examples of the association (presumably in cause and effect relationship) between organic lesions of the brain and peptic ulcers.
- (2) Mogilnitzky and Burdenko have produced experimental ulcers by stimulating various areas in the brain.
- (3) Hall, Ettinger and Banting have produced congestion and ulcerative lesions of the gastric and duodenal mucosa by repeated and prolonged intravenous injection of acetyl choline.
- (4) Severe intra-cranial birth trauma has been followed by the development of peptic ulceration in the newborn.

On the other hand the importance of the various local factors is not to be denied, because ulcer symptoms can be controlled and the lesion healed by adequate administration of diet and alkalis. Furthermore, experimental evidence demonstrates that alterations of the local factors may produce ulceration. Mann was able to produce chronic jejunal ulcers regularly by causing the stomach to empty into the jejunum and the duodenum to empty farther down in the jejunum. Dragstedt, et al, were able to repeat Claude Bernard's work and produce destruction of tissues in living frogs by immersing their extremities in pure gastric juice. The rapidity of the erosion varied, not with the concentration of pepsin but of the acid in the gastric juice. The acidity of the stomach secretion is normally modified by swallowed saliva and food, by alkaline secretion of the glands in the pyloric antrum and by the regurgitation of alkaline duodenal contents.

Modern treatment of duodenal ulcer is based on an appreciation of the relative importance of the central and local factors in its causation and chronicity. It is certain that in some cases the importance of the central factors greatly exceeds that of the local cause. Therefore medical treatment must not only consist of diets and alkalis, but must include an earnest attempt to alter the habits and correct the nervous tendencies which are probably fundamental in the production and maintenance of activity in the ulcer. On the other hand, surgical treatment which is designed to alter the physiology of the stomach and stops at that, fails to do justice to the entire problem. *An ulcer diathesis imposes restrictions which must be observed throughout the patient's life.* Until we know definitely the cause of ulcer and its prevention and control we probably should not speak of cures. *The patient and his symptoms are only*

under control as long as he conforms to a prescribed method of living and eating.

There is now universal agreement among physicians and surgeons that duodenal ulcer is primarily a medical disease; surgery is called for only after the failure of medical measures to give prolonged relief of symptoms, and, of course, to cope with the complications of ulcer such as *perforation, hemorrhage and obstruction.*

Perforation

Acute perforation in duodenal ulcer is an emergency which calls for immediate closure without drainage in early cases. There are some statistics which support those who advocate gastro-enterostomy at the same sitting. Most authorities however, are agreed that closure of the perforation is all the interference that is justified.

Obstruction

A posterior gastro-enterostomy is ideal in the relief of pyloric obstruction due to an old scarred and contracted duodenal ulcer. This would imply a patient past middle life as a rule, who has not a very high gastric acidity. In young patients, in whom pyloric obstruction is due more often to spasm and oedema than to the contraction of scar tissue, the use of a gastro-enterostomy will be followed by stoma ulcers in a high percentage of cases. A gastro-enterostomy is still useful in the non-obstructed chronic ulcer which has not been relieved by medical treatment, in a patient over forty-five who has a low gastric acidity.

Hemorrhage

In hemorrhagic duodenal ulcers gastro-enterostomy is of little value. Severe and recurrent hemorrhage is usually due to a lesion on the posterior wall of the duodenum perforating and eroding large vessels. In a recent article Welch and Yunich reviewed six hundred and ninety cases of admissions to Albany Hospital for gastric and duodenal ulcer. One hundred and twenty eight cases or 18.6% were admitted because of hemorrhage. In two-thirds of these the hemorrhage was severe. The general mortality was 10%. The significant fact was that the mortality was negligible below fifty years of age. In patients over fifty the mortality was 20%, increasing with each decade thereafter. In other words incipient or established arterio-sclerosis is probably one of the main contributing factors to this high mortality. Young people with hemorrhagic ulcers respond very well to medical treatment and should therefore be managed thus. *Careful search for and elimination of all foci of infection in these cases is especially important.* In older people with repeated hemorrhages some form of excision or resection operation should seriously be considered. As a rule emergency surgery in these bleeding ulcer cases is not advisable. Medical measures are employed to tide them over the emergency and a planned operation done later.

The Nervous High Strung Patient

The patient who gives the greatest difficulty to physician and surgeon alike, is the one in whom we are most particularly interested. This is the young nervous patient with many responsibilities and worries, who has marked ulcer symptoms, and is found almost always to have a very high gastric acidity. This patient demands ultra conservative treatment if disaster is to be avoided. The utmost in medical management is required including rest in bed, freedom from all responsibilities, avoidance of alcohol and tobacco, elimination of focal sepsis, strict diet and alkalis, and the free use of sedatives. Most important of all perhaps in such a case is the liberal and frequent use of reassurance by the physician. In this connection it is advisable to impress upon the patient the fact that duodenal ulcers never become malignant. An individual of this type is very apt to be cancer-conscious. He is being told repeatedly by radio and by press that chronic indigestion is sometimes due to cancer. The patient who is obliged to nurse his ulcer along for years must have his fears allayed, otherwise our cancer propaganda may have an aggravating effect on his symptoms.

If such an ulcer patient fails to respond satisfactorily to a medical regime and surgery becomes imperative in order to restore the patient to economic and social usefulness, nothing short of the most radical surgery possible offers any hope of success. These are the patients who become ulcer invalids with frequent operations, recurrent ulcers and finally neoplastic changes in the stomach, unless a gastric resection is done. Visualization of this whole tragic series of events should be possible at the very beginning in such a patient. Suitable surgery, properly planned and carried out will save these patients much misery. The natural history of ulcer patients suggests there are periods when the unknown etiological factor may be especially active; during this active period medical treatment for two to four weeks should precede any surgical interference. Rest is ordered, smoking, foci of infection, etc., may be eliminated during that time. This period of medical management does much to reduce the inflammatory oedema and infection at the site of the ulcer. A patient who has been thus managed and brought to a period of comparative inactivity of the ulcer and presumably reduced vulnerability of the gastro-intestinal mucosa to peptic ulceration will not only make a smoother immediate recovery but will have a much better chance of avoiding later trouble.

Summary

Gastro-enterostomy for duodenal ulcer is indicated:

1. For the relief of pyloric obstruction due to cicatricial stenosis.
2. In chronic duodenal ulcers which have been present for many years, without serious surgical complications but with symptoms incompletely relieved by medical treatment and

associated with a relatively low acidity. This applies particularly to patients over 45 years of age.

Subtotal gastrectomy is indicated in the treatment of duodenal ulcer in the following circumstances:

1. For the relief of stoma ulcers.
2. For duodenal ulcer complicated by severe and repeated hemorrhage, especially in patients past middle age.
3. Duodenal ulcer associated with marked gastritis (rare) or gastric ulcer.
4. In chronic ulcer with intractable pain especially in a nervous individual with high acidity.

In conclusion I should like to emphasize that one is not advocating subtotal gastrectomy as a routine procedure for duodenal ulcer. This operation should be reserved for selected cases with major complications, and for that group of cases in which it can be predicted pre-operatively that the risk of stoma ulcer formation is unduly great.

There is still a definite place for a posterior gastro-enterostomy in the surgical management of these lesions. Its limitations have been indicated. When it is done in cases where its use is contra indicated, it exposes the patient ultimately to an entirely unjustified major hazard.

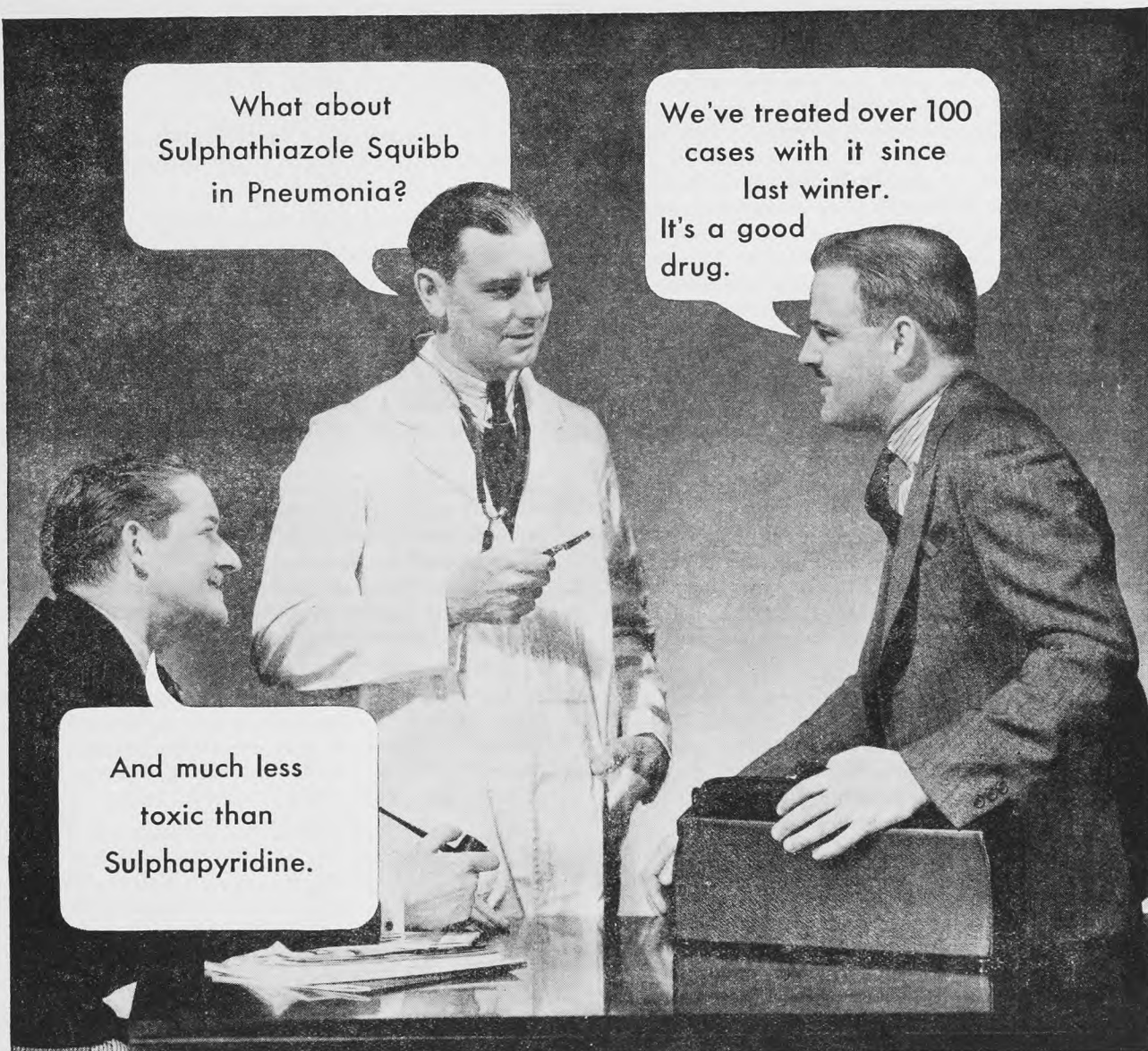
The only way in which the incidence of serious complications can be reduced in duodenal ulcer is by adequate medical treatment; simply prescribing a diet and an alkali is not adequate treatment. The temperament and the habits of the individual are probably more important than the ulcer itself; therefore adequate medical and surgical treatment should include an effort to create a new attitude of mind toward work, leisure and the selection of foods. In other words this implies an attempt to minimize as far as possible all those factors which might predispose to further reactivation of his ulcer.

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Editorials and Association Notes

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Advances in the Treatment of War Wounds

At the beginning of the Great War 1914-18 surgeons relied largely on antiseptics and drainage in the management of war wounds. It became evident very early that on the grossly contaminated soil of France these methods were totally inadequate and that more effective means of dealing with wounds would have to be found.

Treatment Principles 1914-18

During the remainder of that struggle certain principles evolved with a corresponding improvement in results. These principles may be enumerated:

1. Shock and hemorrhage had to be dealt with before an attempt was made to treat any but the simplest of wounds.
2. Early and complete excision of all damaged tissues, where possible, was carried out, and important tissues such as nerves, tendons and joint capsules repaired after thorough lavage of the entire track.
3. Closure of the wound was effected where possible, with or without drainage, depending on the extent of tissue damage, the time that had elapsed since injury, and the effectiveness with which it had been possible to excise damaged tissues.

4. Where closure was impossible, owing to the extent of tissue destruction, a dry gauze dressing was applied and the entire area, if an extremity, encased in plaster, to be left undisturbed as long as might be desirable.
5. Prophylactic doses of anti-tetanic and gas-gangrene serum were widely used. The efficacy of the former was more clearly demonstrated than that of the latter.

Recent Advances

During the years since 1918 certain additions to our knowledge have been made. They were employed effectively in the Spanish Civil War and are now being utilized in Europe and Africa. It may safely be assumed that these new methods of wound treatment will be adequately tried and tested as this war continued.

Closed Plaster Method

The closed plaster method (introduced by Winnett-Orr 1917) is receiving increasing use in compound fractures, and in wounds with extensive destruction of tissues. Shock is lessened, spread of infection minimized, and convalescence shortened by the widespread use of this method of wound treatment. It should be emphasized that good results obtained by the employment of this method, are not due solely to the use of the plaster but the concomitant application of all the other principles laid down in the last war.

Debridement and Sulphanilamide Powder

Early debridement followed by the local introduction of Sulphanilamide powder in soft tissue wounds and compound fractures has been found to eliminate almost entirely an incidence of infection which in a series treated in the same way except that Sulphanilamide was not used, was no less than 27%. The use of Sulphanilamide can be, and is being combined with the closed plaster method of treating early cases. In late cases where infection has already occurred, the value of Sulphanilamide is not nearly as definitely established.

Hypertonic Solutions in Late Infected Wounds

The failure of the local application of antiseptics and of irrigation of infected wounds to do very much in the way of shortening the time of healing is becoming more and more widely recognized. Some writers even go so far as to recommend the discontinuance of irrigation. Lyth, of London, quotes some striking experimental work supplemented by case histories to demonstrate the value of a saturated solution of Sodium Sulphate, in extracting from the tissues, by virtue of its high osmotic pressure the accumulated serum, bacterial products and toxins due to the breakdown of tissues which interfere with nature's attempts at destroying invading organisms. This preparation

has its chief value in the management of late cases in which infection is already established. Hypertonic saline and saturated magnesium sulphate solution have been used previously in the management of infected wounds. Dakins irrigations probably fall into the category of hypertonic treatment. Saturated sodium sulphate solution in Lyth's opinion, promises to be more effective than any of those solutions hitherto used for their hypertonic properties.

Serological Methods

The routine use of tetanus toxoid in this war will probably be even more effective in reducing the incidence of tetanus than was antitetanic serum. Gas gangrene serum is still of doubtful value, but sulphanilamide and its derivatives may reduce the incidence of anaerobic infection.

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Post-Graduate Course

The Faculty of Medicine announces a three-day post-graduate course to be held on March 6th, 7th and 8th, 1941.

This course will deal with modern methods of diagnosis and treatment. One full day each will be taken over by the Departments of Medicine and Surgery. A clinical-pathological conference, a Tumour clinic, and an afternoon session on Public Health problems will round out the programme.

Full details of this course will be published in next month's *Review*.

Medical Aspects of Concentration Camps

(*British Medical Journal*, Nov. 25, 1939, p. 1054)

The Government White Paper¹ and newspaper summaries of it have given the world some idea of the conditions of life in the concentration camps for political prisoners in Germany before the war. To find parallels to these conditions it is necessary to go back to exceptional periods of unrest among Oriental or savage peoples. The documents in the White Paper are closely corroborated by much other independent testimony, and an interesting sidelight from the medical point of view is contributed to the *Catholic Medical Guardian* for October by a German doctor who was confined in the camp at Dachau.

The beginning of the imprisonment for many victims was, he says, a long journey in a train, into the compartments of which they were driven by the boots and rifle butts of their S.S. guards. Twenty were crowded into a space made for ten and the doors and windows closed. On arrival at the camp they ran the gauntlet of two lines of guards armed with bayonets and clubs. They were then kept standing at attention on the parade ground for hours with no food or water or opportunity to attend to the calls of nature. Some had their ears permanently damaged, and some had blood-suffused eyes from beating on the head. Thereafter they were forced to work at the severest manual labour day after day, and the chief object of their guards seemed to be to inflict as much torment as possible. The drinking of water was forbidden throughout the day; the loads were calculated to be beyond the strength of the workers; the guards kept up a rain of kicks and blows. Prisoners who broke down were sent to the punishment squad. Heads were bare in high summer; clothes were continually wet in winter.

Diet and Punishment

The diet supplied on the average between 1,200 and 1,500 calories a day. The usual morning allowance was a quarter of a litre of black unsweetened acorn coffee, with no nourishment value. The prisoner took to work such bread as he might have saved from the day before. His evening meal was usually soup, containing 300 grammes of potatoes, cabbage, or beans, with 300 grammes of black bread. Occasionally the issue was supplemented by 50 grammes of black pudding, or by a little jam, cheese or syrup. Fat was almost completely absent; pulse of various kinds was common. Sanitation was relatively satisfactory in Dachau, but in Buchenwald it was abominable. Though dysentery and enteritis were common, the latrines could only be used at certain hours of the day. Clothing and shelter were miserably insufficient.

In addition to the individual brutality of the guards, formal punishments included flogging, suspension from trees, and solitary confinement in darkness. Flogging was standardized at twenty-five lashes with a steel rod or ox penis on the

buttocks, after which the prisoner must stand at attention facing a wall for twelve hours without eating or drinking. Huge haematomata developed around the wounds, and fever, whether of resorption or suppuration, followed. For tree-hanging the prisoner had his hands tied behind his back. At first the pain was agonizing, owing to the strain upon the brachial plexus and the cutting of the chains into the skin; the body gradually stretched owing to the elasticity of the intervertebral disks, and the sensation was that of being torn asunder by the legs. The acutely painful phase was followed by parasthesia and then by a sensation of paralysis; the muscles then became lifeless and the backs of the hands oedematous. The suspension usually lasted an hour and a half, and for days afterwards the hands and feet were stiff and unfeeling.

Psychological Features

On the psychological side, says this writer, neurosis is endemic, and takes the form of anxiety, ruthless egotism or despair. The ordinary prison neuroses are rare, as the captives are mostly innocent of crime. Queerly enough, physical neuroses, especially of the gastro-intestinal tract, improved in spite of extremely indigestible food. The author therefore thinks it a safe generalization that the best cure for this class of nervous disorders is "authoritative and imperative suggestion therapy." The psychical injury which does not express itself in physical symptoms must, however, be incalculable. The author makes some reflections on the possible effect which their occupation may have on the minds of the youths who are especially selected and taught the technique of cruelty to defenceless men which is a necessary qualification for the S.S. guard. It is a melancholy thought that 7,000 young men are posted to Buchenwald at a time and that any tendencies to sadism they may have are given full opportunity for development. Parties of Hitler Youth are taken through the camps and one of the functions of these institutions seems to be to brutalize the German youth of military age. The student of morbid psychology would find an ocean of material in unexpurgated accounts of these camps which for reasons of decency cannot be published. The colossal work of undoing the spiritual harm that is being wrought among victims and guards alike baffles the imagination.

Medical Treatment

Generally speaking, this writer found medical treatment perfunctory. At the worst the sick were driven to work and left to die where they dropped. Occasionally obvious complaints like a "struma" or hydrocele were treated and the patient allowed lighter work. Duodenal ulcers, weak hearts, active tuberculosis, and diabetes were disregarded. Patients in hospital were left entirely to the mercy of the orderlies or of fellow prisoners doing supervision duty. A certain amount was done on the surgical side: palmer phlegmons were cut out, and compound fractures

of the hands and feet caused by accident or violence were treated by amputation. A civilian dentist gave some treatment at Dachau, but in Buchenwald not even extractions were performed; periosteal abscess and caries were extremely common. Innumerable dirt diseases, such as impetigo, furunculosis, erysipelas, eczema and infective fungoid diseases were rife, and, owing to the lack of vitamins and rest, wounds healed with difficulty. The sick, even those unable to walk, were dragged to roll-call twice a day by their friends. A common complaint was oedema of the backs of the hands and ankles. In Dachau large numbers suffered from tenosynovitis. In Buchenwald hundreds of prisoners caught an acute itching dermatitis of the edge of the pinna, due either to a fungus silica dust, or allergy produced by the nettle-fibre blankets. It yielded to painting with a zinc solution. There was, of course, a wide variety of disease not attributable to the camp conditions, but a very large number of acute cases were fatal—perforated appendix, ileus, cancer, and pneumonia. In the opinion of the author 80 per cent. of the deaths could have been prevented by proper medical attention.

Moral Fortitude

A few items are recorded on the positive side. Some prisoners were able, by submission to the discipline and by developing the habit of enduring privation, to school and strengthen their characters. The White Paper mentions the Bibelforscher, members of a religious sect, who were almost as badly treated as the Jews, but whose courage and religious faith were remarkable and who professed themselves ready to suffer to the utmost what they felt God had ordained for them.

Hunger and work appeared to agree fairly well with some of the diabetics, who although they received no insulin showed no sign of coma. Some of them had lost as much as 80 lbs. and still felt fairly well. Almost all sufferers from psoriasis were strikingly benefited. Colds were rare. All prisoners dreaded the camp hospital with its appalling death rate, and the will not to be ill must have strengthened their weakened organisms.

The question that remains in the mind after reading these terrible reports is why those in power should find it necessary to expend so much trouble and ingenuity in heaping gratuitous torment on thousands of helpless people.

1. 1 Cmd. 6120. London: H.M. Stationery Office. (3d).

Correction

In the December issue of the *Review* it was stated on page 226 that the 4½ cent mileage allowance on income tax report given medical practitioners in Manitoba becomes effective January 1st, 1941. It should have read "becomes effective January 1st, 1940."

Personal Notes and Social News

Conducted by Gerda Fremming, M.D.



REETINGS FROM THE PRESIDENT

Through the medium of *The Manitoba Medical Review* I extend to all members of the medical profession in Manitoba cordial New Year Greetings. May 1941 be a year of good health, happiness and accomplishment for you and yours. May 1941 be a year of progress and of the pursuit of wise policies by the Manitoba Division of the Canadian Medical Association to further the interest and to warrant the confidence of the medical profession and the public generally. May 1941 be a year in which the ideals of Christianity and Democracy will be restored to the peoples on Earth.

Yours fraternally,

E. L. Ross

President,

Manitoba Division of
The Canadian Medical Association.



Dr. John J. Leishman, of Fort Francis, Ont., son of Mr. and Mrs. B. Leishman, of Kenora, Ont., was married Saturday, November 30th, at Cardale, Man., to Freda Eleanor, daughter of Mr. and Mrs. C. Hyndman. After the wedding Dr. and Mrs. Leishman left for Winnipeg and Kenora.

♥ ♥ ♥

The Association extends its deepest sympathy to Drs. V. F. and Joseph Onhauser on the loss of their mother, who died December 4th, 1940.

♥ ♥ ♥

Dr. and Mrs. Charles Code, of St. Paul, Minn., are receiving congratulations on the birth of a daughter.

♥ ♥ ♥

Dr. F. A. L. Mathewson, R.C.A.F., Toronto, is home on Christmas leave and is spending the holidays with his family.

Dr. and Mrs. E. H. Alexander and son, Kenneth, have returned from a month's vacation to the Pacific coast, where they visited Vancouver, Victoria and Harrison Hot Springs.

♥ ♥ ♥

Dr. David Christie has joined the R.C.A.F. as a medical officer and is stationed at Regina, Sask. On leaving Elfros, Sask., Dr. and Mrs. Christie were given a farewell party and presentation.

♥ ♥ ♥

Dr. Anna Wilson is enjoying the holidays at her home in Edmonton, Alta.

♥ ♥ ♥

Dr. Mary Crawford left December 20th to spend the Christmas season in Calgary, Alta.

♥ ♥ ♥

Dr. and Mrs. J. S. Poole, who have been residing in Winnipeg during the session of the Manitoba legislature, have returned to Neepawa for the Christmas holidays.

♥ ♥ ♥

Dr. and Mrs. Gordon Chown are enjoying the company of their son, Pilot Officer Douglas Chown, who is on Christmas leave from the R.C.A.F.

♥ ♥ ♥

The following doctors were guests at a supper dance in the Empire Grill, St. Charles Hotel, given by the 3rd Casualty Clearing Station of the Canadian Army Reserve:—Col. and Mrs. P. Bell, Col. and Mrs. W. A. Gardner, Lt.-Col. and Mrs. E. Holland, Lt. and Mrs. H. Meltzer.

♥ ♥ ♥

Dr. J. R. Martin, of Neepawa, Man., has suggested that the *Review* publish occasional biographies of senior members of the profession in Manitoba. This idea is appreciated and the first biography will appear in the near future.

♥ ♥ ♥

The Gladstone Board of Trade are anxious to have a second doctor settle in the locality. An office and living quarters are available. Further information can be obtained from V. A. Vincent, Gladstone, Man.

♥ ♥ ♥

The *Review* is always glad to receive items of a personal or social nature for this page; however, as the *Review* goes to press a week in advance of publication date, contributions must be in by the 20th of the month preceding date of issue.

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Folks used to make their own clothing on spinning wheels. Now they lose their shirts on 'em.
—Chatham News.

Department of Health and Public Welfare

Benzol (Benzene) Poisoning

The possible dangers arising from the use of benzol in industry have been recognized for some time, consequently solvents of a less toxic character, such as toluol, have in many instances been substituted. The demands of various war industries are now using practically all available toluol so that benzol will be more widely used for general purposes and the likelihood of poisoning from benzol will be enhanced.

In the Province of Manitoba there are approximately 275 business or industrial concerns that are potential users of benzol.

Industrial Uses

The following types of workers are most likely to be exposed to the danger of benzol poisoning:—

- Aeroplane dope workers
- Aniline workers
- Artificial leather workers
- Benzol still workers
- Blenders (motor fuel)
- Brake-lining makers
- Chemists and chemical workers
- Cleaners and spotters
- Coal tar workers
- Coke oven workers
- Degreasers
- Dry cleaners
- Explosives workers
- Fur cleaning workers
- Furniture stainers
- Gas (illuminating) workers
- Hat sizers
- Lacquer workers
- Linoleum workers
- Nitrobenzene workers
- Oil cloth makers
- Paint removers
- Patent leather workers
- Peat workers
- Phenol workers
- Photogravure workers
- Pyroxylin-plastic workers
- Rotogravure workers
- Rubber cement workers
- Rubber workers (dippers)
- Sanitary can workers
- Shade cloth workers
- Shellac workers
- Shoe finishers
- Shoe repair workers
- Spray painters
- Varnish workers.

Benzol (benzene) is obtained by distillation of coal tar and by recovery from coke oven gas, illuminating gas, crude petroleum of certain types as well as from cracking of crude petroleum. It must not be confused with benzine which is a fraction of crude petroleum and which does not possess the poisonous properties of benzol (benzene).

Pure benzene is a colourless liquid with a characteristic agreeable odour. It boils at 80° centigrade (176° fahrenheit). Benzol is a commercial product containing approximately 90% of pure benzene. It evaporates readily when exposed to the air and gives off a vapour which is three times as heavy as air and which, therefore, may collect at floor level. Benzol (benzene) is high inflammable and its vapour forms an explosive mixture when mixed with air.

Poisoning by Benzol (Benzene)

Poisoning by benzol (benzene) occurs as a result of breathing the vapour which is absorbed into the

body by way of the respiratory tract. Because benzol (benzene) evaporates so rapidly when exposed to air, dangerous quantities of the vapour will be present in the air unless evaporation of the liquid benzol is prevented. When once absorbed, benzol (benzene) exerts its poisonous action on the nervous tissues and on the blood-forming structures.

The safe limit of 100 parts per million in the air generally accepted since about 1926 is now considered too high and should be dropped to 75 parts per million.

Acute Poisoning

Acute poisoning by benzol (benzene) results from the breathing of air containing large amounts of benzol vapour. Accidents such as failure of ventilation equipment and spilling may result in acute poisoning to workers exposed. Acute poisoning may also occur in the case of workers entering enclosed spaces containing benzol fumes—spaces such as tanks, etc. The effects of breathing the benzol-laden air occur rapidly. The worker exposed becomes dizzy, breathless or excited and if not removed at once loses consciousness. Frequently the effects of such exposure are fatal.

Chronic Poisoning

Chronic poisoning is the common type of benzol poisoning in industry. Chronic poisoning occurs as a result of continued daily breathing of air containing low concentrations of benzol vapor. It cannot be too strongly stressed that chronic benzol poisoning can develop to a critical stage without the worker being aware for sometime that he is being poisoned. Death may even occur without benzol being suspected as the primary cause.

"Clinical symptoms are variable, they may include weakness, fatigue, epistaxis, dryness of throat, anorexia, nausea, dizziness, insomnia, lethargy and dermatitis. But any or all of these symptoms may be absent in persons with severe blood changes.

The blood pictures show that benzene may bring about leukopenia, but also leucocytosis, anemia or polycythemia, eosinophilia, complete absence of abnormal red cells or macrocytosis and microcytosis, complete absence of regenerative activity or the presence of immature forms in the circulating blood; leukemia or leukemoid blood pictures, in short a variety of blood changes. As to the blood changes which should be looked for in the early stage of benzene poisoning one group of workers find that leukopenia cannot be depended upon. A complete blood examination is necessary and the most important change is anemia. A decrease of the polynuclear percentage is more significant than either leukopenia or an absolute polynuclear decrease. Eosinophilia was found often enough to suggest that it is an early sign of marrow injury.

"Yant's test for urinary sulphates finds a pronounced difference between forenoon and afternoon specimens but not between those taken on different days in the week. The normal rates between inorganic and organic sulphates falls as the work day goes on to rise again slowly in the evening. Some believe that this test is of greater value in revealing exposure to benzol than is a routine medical examination but add that an air analysis is the only really efficient method of discovering how great is the hazard in any individual plant. One writer states, "It is doubtful if any concentration of benzene greater than zero is safe over a long period of time."

Treatment

In acute poisoning the patient should be moved from exposure to the open air and artificial respiration employed if necessary.

In the chronic form the hazard should be eliminated. Various types of therapy have been used, liver in various forms, ventriculin, ascorbutic acid and thiamin.

(1) Prevention

1. To introduce less toxic substitutes for benzol.
2. If necessary to use benzol, isolate benzol processes and confine the material in closed vessels wherever practicable.
3. To remove benzol vapour by exhaust ventilation at the point of origin when the material requires to be used in open vessels.
4. To provide adequate ventilation, in addition to exhaust hoods, for all workrooms in which benzol is being handled.
5. To insure that ventilating equipment is operating satisfactorily by having workroom air tested for benzol routinely. Seventy-five parts of benzol vapour per million parts of air is now considered the maximum safe concentration.
6. To insure that no worker may enter a tank or enclosed space until thorough ventilation has been carried out. Persons required to enter tanks or enclosed spaces which have contained benzol should be provided with gas masks of a type approved by the Provincial Department of Health. Workers entering tanks and enclosed spaces should be protected by a safety belt and by the presence of another worker on the outside.
7. To provide protective clothing for workers required to use liquid benzol.
8. To insure frequent periodic medical examination of all workers exposed to benzol. Such examination should be carried out by a physician familiar with benzol poisoning and should include a blood examination. Health records of benzol workers should be kept and medical advice as to transfer of an affected worker from benzol work to more innocuous duties must be acted upon promptly.
9. To insure that both employer and employee know when benzol is being handled. Benzol is frequently contained in materials that are distributed under a trade name, therefore all benzol and benzol-containing products should be labelled "Contains Benzol."
10. To insure that all those connected with the manipulation of benzol are made aware of its toxicity.

—C.R.D.

References

- (1) Pamphlet issued by Dept. of Pensions & National Health—Benzol Poisoning.
- (2) Industrial Medicine Journal of February, 1940—Benzol Poisoning.

COMMUNICABLE DISEASE REPORT

October 8th - November 4th

Measles: Total 328—Brandon 39, Tuxedo 39, Whitehead 32, Sifton 23, Oak Lake Town 20, Dauphin Town 17, Hanover 14, Winnipeg 11, Thompson 8, Gilbert Plains Rural 6, St. James 6, Dauphin Rural 5, Saskatchewan 5, Cypress South 4, Gladstone 4, Oakland 4, Pilot Mound 4, Louise 3, Miniota 2, Boissevain 1, Virden 1, Westbourne 1, Woodworth 1 (Late Reported: Fort Garry 61, Unorganized Territory 6, Transcona 5, South Cypress 4, Hanover 2).

Chickenpox: Total 239—Winnipeg 140, Unorganized Territory 21, Flin Flon 18, Portage Rural 10, St. Francois Xavier 10, St. James 9, Stonewall 5, Gladstone 4, Brandon 3, Russell Rural 2, Sifton 2, Boissevain 1, Melita 1, Oakland 1, Rockwood 1, Selkirk 1, Tuxedo 1, Whitehead 1 (Late Reported: Unorganized Territory 5, St. Clements 2, Portage Rural 1).

Whooping Cough: Total 172—Winnipeg 83, Rockwood 19, Kildonan West 10, St. Clements 9, Dauphin Town 7, Arthur 6, St. Boniface 6, Woodlands 6, Unorganized Territory 4, Blanshard 3, Tache 2, Hanover 1, Montcalm 1, St. Vital 1 (Late Reported: Unorganized Territory 6, Hanover 2, Rosedale 2, St. Clements 2, Rapid City 1, Blanshard 1).

Mumps: Total 86—St. Boniface 53, Winnipeg 28, Rosedale 2, Minto 1, St. James 1, Tuxedo 1.

Scarlet Fever: Total 32—Winnipeg 9, Unorganized Territory 4, St. Vital 3, Ochre River 3, Binscarth 1, Brandon 1, Brooklands 1, Carman 1, Dauphin Town 1, Dufferin 1, Ellice 1, Neepawa 1, North Norfolk 1, Ritchot 1, Souris 1, Tuxedo 1 (Late Reported: The Pas 1).

Diphtheria: Total 27—Winnipeg 21, Emerson 4, St. James 1, Unorganized Territory 1.

Tuberculosis: Total 12—Winnipeg 10, Unorganized Territory 1, Brandon 1.

Erysipelas: Total 10—Winnipeg 4, Unorganized Territory 1, St. Vital 1, St. Boniface 1, Gilbert Plains Rural 1, Brooklands 1 (Late Reported: Lac du Bonnet 1).

Pneumonia Lobar: Total 8—Lansdowne 1, Ste. Rose Rural 1 (Late Reported: Ste. Rose Rural 2, Deloraine 1, Dufferin 1, Old Kildonan 1, St. Clement 1).

Typhoid Fever: Total 6—Hanover 1, Portage City 1, Ritchot 1, Stanley 1, Tache 1 (Late Reported: Hanover 1).

Diphtheria Carriers: Total 6—Winnipeg 6.

German Measles: Total 5—Arthur 2, Melita 2, Brandon 1.

Septic Sore Throat: Total 4—Gilbert Plains Rural 3, Rockwood 1.

Influenza: Total 4—Winnipeg 2, Tache 1, Strathcona 1.

Undulant Fever: Total 3—MacDonald 1, Transcona 1 (Late Reported: Transcona 1).

Anterior Poliomyelitis: Total 1—Harrison 1.

Meningococcal Meningitis: Total 1—Selkirk 1.

Treaty Indians: Diphtheria 2, Pneumonia Lobar 1.

Venereal Disease: Total 151—Gonorrhoea 115, Syphilis 36.

DEATHS FROM COMMUNICABLE DISEASE

October, 1940

URBAN—Cancer 56, Tuberculosis 4, Pneumonia Lobar 2, Pneumonia (other forms) 2, Syphilis 2, Influenza 1, Cerebrospinal Meningitis 1, Typhoid 1, other deaths under one year 17, other deaths over one year 202, Stillbirths 18. Total 306.

RURAL—Cancer 32, Tuberculosis 9, Pneumonia Lobar 3, Pneumonia (other forms) 8, Influenza 4, Whooping Cough 3, Dysentery 2, Lethargic Encephalitis 1, other deaths under one year 30, other deaths over one year 128, Stillbirths 8. Total 228.

INDIANS—Pneumonia 4, Tuberculosis 4, other deaths under one year 2, other deaths over one year 4, Stillbirths 1. Total 15.

Medical Practice Available at Angusville, Man.

Doctor formerly located here now serving with the Canadian Forces. Municipality of Silver Creek passed Municipal Doctor By-Law. 27 Sections of Rosburn Municipality and Indian Reserve to be included. Salary \$3,500 to \$4,000. For full particulars apply to P. W. Chittick, Secy.-Treas., R.M. of Silver Creek, Angusville, Man.